

## A Getting Started

Things like cost, speed and rainfall are rates.  
The unit for a rate contains the word 'per'.

For instance : The unit for cost is dollars *per* item.  
The unit for speed is km *per* hour.  
The unit for rainfall is mm *per* year.

1 Match the rate with the unit.

| Rate             | Unit                      |
|------------------|---------------------------|
| speed            | ◆ kilowatts per hour      |
| growth rate      | ◆ kilometres per hour     |
| fuel consumption | ◆ kilometres per litre    |
| paint coverage   | ◆ dollars per pound       |
| electricity use  | ◆ centimetres per year    |
| exchange rate    | ◆ square metres per litre |

2 Think of a possible unit for these rates.

- a) weight loss ..... per .....
- b) heart rate ..... per .....
- c) pay rate ..... per .....
- d) mail sorting ..... per .....

3 Jason gets paid \$5.50 per hour to baby-sit his younger sister. How much does he get paid for  $3\frac{1}{2}$  hours of baby-sitting? .....

4 On a paint tin is printed '1 L covers 15 square metres'. How many square metres can be covered with 2.5 L of this paint? .....

5 Our car used a full tank of petrol (40 L) to drive 520 km from Hamilton to Wellington. Calculate our car's fuel consumption in kilometres per litre. ....

6a) Mr Watson exchanged 250 NZ dollars for 17500 yen. At this rate, how many yen do you get for one NZ dollar? .....

b) How many yen does Vicki Watson get for \$40? .....

## B Speed

Example :

A tourist bus takes 6 hours to travel from Christchurch to Dunedin, which is a distance of 372 km.

- a) What is the speed of the bus in kilometres per hour (km/h)?  
b) At this speed, how far does the bus travel in 15 minutes?

Working :

- a) 372 km in 6 hours, that is  $372 \div 6 = 62$  km in 1 hour.  
Speed = 62 km/h  
b) 15 minutes is  $\frac{1}{4}$  of an hour.  
distance travelled =  $\frac{1}{4}$  of 62 km = 15.5 km.

1 A plane takes 5 hours to fly 4620 km.

a) What is the speed of the plane? .....

b) At this speed, how far does the plane fly in 20 minutes. ....

2 It took Rewi half an hour to bike 8 km.  
What was Rewi's speed in km per hour? .....

3 At an average speed of 100 km/h, what distance would be covered in ...

a) 15 minutes? .....

b) 6 minutes? .....

4 Driving at an average speed of 80 km/h how long will it take us to drive 520 km from Hamilton to Wellington? .....

5 Kara took 20 minutes to walk the 2 km to Emma's house.

a) If Kara kept walking at the same speed, how far would she have walked in 1 hour? .....

..... km

b) Kara ran back home, covering the 2 km in 15 mins. What was Kara's speed on the way home? .....

..... km/hr





## A Measure

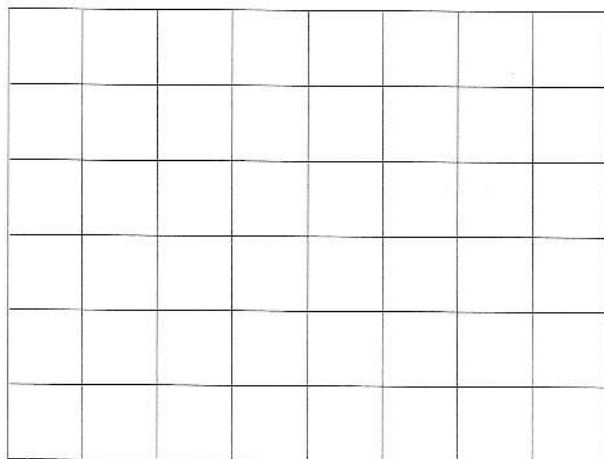
The perimeter of a shape is the total length of the boundary lines. Since perimeter is a length, the unit is mm, cm, m or km.

Example : Measure the perimeter of this rectangle.  
Give your answer in centimetres, accurate to the nearest millimetre.



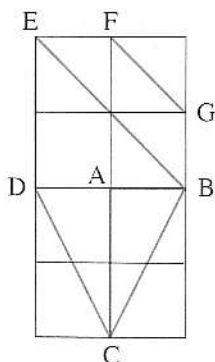
Working :  
 $4.2 + 0.9 + 4.2 + 0.9$   
 $= 10.2 \text{ cm}$

- 1 Draw a rectangle and a square, each with a perimeter of exactly 12 cm.

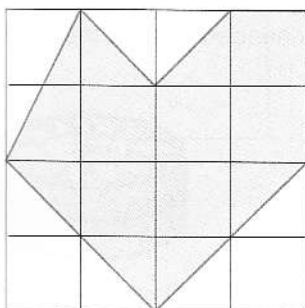


- 2 True or False? (Write T or F)

- a) length ED = length CD .....  
 b) length EB = length BC .....  
 c) length BC = length DC .....  
 d) length EB = 2 x length FG .....  
 e) length BA + length AC = length BC .....



- 3 Find the perimeter of the green shape.  
Give your answer in cm, accurate to the nearest mm.

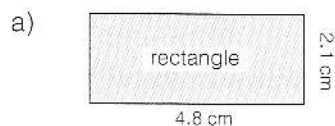


## B Sketches

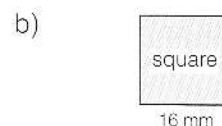
A sketch is a rough picture of a real life situation.

We often find that in sketches only a few measurements are given. Since the diagrams are not to scale we must calculate the missing lengths in order to find the perimeter.

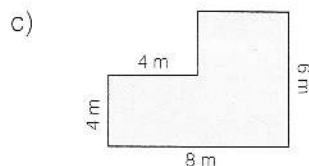
- 1 Calculate the perimeters of these shapes.



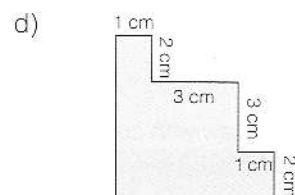
P = .....



P = .....

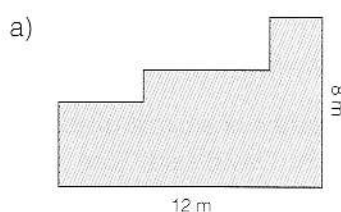


P = .....

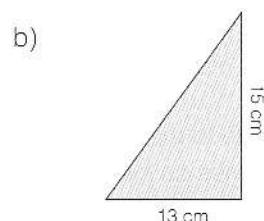


P = .....

- 2 Is there enough information to calculate the perimeters of these shapes? Find the perimeter if possible. If it's not possible - say so.

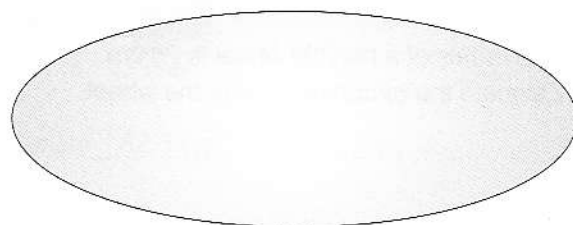


P = .....



P = .....

- 3



Use a piece of cotton and a ruler to estimate the perimeter of this oval. ....

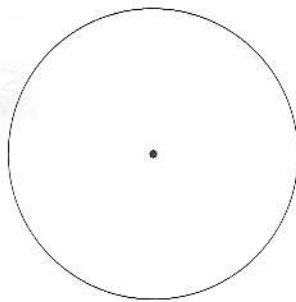
# 56 Circumference



## A Going Round in Circles

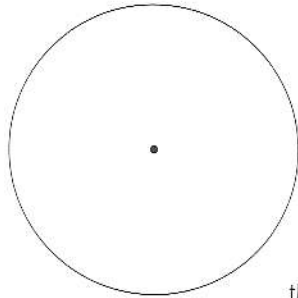
1a) Label with  $M$  the centre of this circle.

b) Draw and label with  $r$  the radius of the circle.



c) Draw and label with  $d$  the diameter of this circle.

d) Describe what is meant by the *circumference* of a circle.



2a) Draw with compasses a circle with centre  $M$  and radius 2 cm.

b) Measure the diameter of this circle.

$d =$  .....

c) Use a piece of cotton to measure the circumference.

$C \approx$  .....

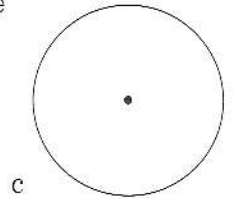
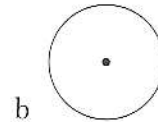
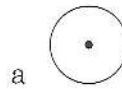
3 We found that the circumference of a circle is about 3 times as long as the diameter. David said, "The circumference of a circle is about 6 times as long as the radius". Do you agree? Explain your answer.

4 The *radius* of a bicycle wheel is 28 cm. Estimate the *circumference* of the wheel.

5 The diameter of a tree stump is 1.8 m. Estimate the *circumference* of the tree.

## B Pi

1 Measure the diameter and estimate the circumference of these circles.



Circle a :  $C \approx$  .....

Circle b :  $C \approx$  .....

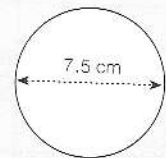
Circle c :  $C \approx$  .....

The exact length of the circumference of a circle is found with the formula  $C = \pi \times d$ .

In this formula  $C$  stands for circumference,  $d$  for diameter and  $\pi$  (say pi) is the number 3.141592654, which can be rounded to 3.14.

Example : A circle has a diameter of 7.5 cm. Calculate the length of the circumference.

Working :  $C = \pi \times d$   
 $= 3.14 \times 7.5$   
 $= 23.55 \text{ cm}$



2 Calculate the circumference of each circle in question 1.

Circle a :  $C = 3.14 \times 1 =$  ..... cm

Circle b :  $C =$  ..... cm

Circle c :  $C =$  ..... cm

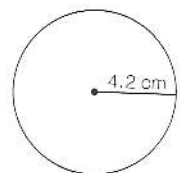
3 A circle has a radius of 4.2 cm.

a) Calculate the diameter.

$d =$  ..... cm

b) Calculate the circumference.

$C =$  ..... cm



4 How much sticky tape is needed to stick the lid to this container?

